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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/553,534	11/29/2005	Hubert Spreitzer	14113-00028-US	4132
23416 7590 09/29/2008 CONNOLLY BOVE LODGE & HUTZ, LLP P O BOX 2207 WILMINGTON, DE 19899				
EXAMINER HEINER, LIAM J				
ART UNIT		PAPER NUMBER		
1796				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/553,534

Applicant(s)

SPREITZER ET AL.

Examiner

Liam J. Heincer

Art Unit

1796

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 July 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9, 11-13 and 15-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9, 11-13 and 15-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/S508)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on July 9, 2008 has been entered.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stern et al. (US Pat. 5,763,539) in view of Hontis et al. (Polymer 42 (2001) 5793-5796, cited by applicant in IDS 10/2005) and as evidenced by Taylor et al., Substituted PPV's for Blue Light.

Considering Claims 1 and 7: Stern et al. teaches a process for preparing poly(arylenevinylenes) from a halomethylsulfinylmethylarylene (Formula I) by base induced dehalogenation (scheme I, col. 7), where the reaction is carried out in the presence of a compound of Formula I (Formula I). Stern et al. teaches using mixtures of different monomers (6:60-63).

Stern et al. does not teach the claimed mol%. However, differences in concentration will generally not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. See MPEP §2144.05. Taylor et al. shows that the amount of the hindered monomer will alter the molecular weight (Section 2.1), thus making it a result effective variable. It would have been obvious to a person having ordinary skill in the art at the time of the invention to have optimized the mol% of the monomers of formula I, and the motivation to do so would have been, as Taylor et al. suggests, to give the desired lower molecular weight (Section 2.1). Stern et al. teaches that reducing the molecular weight would be desired to prevent precipitation of the polymer (3:8-10).

Stern et al. does not teach the monomers as being bis(halomethyl)arylenes. However, Hontis et al. teaches forming a poly(phenylene-vinylene) through the Gilch Polymerization/bis(halomethyl)arylene monomers (pg. 5793). Stern et al. and Hontis et al. are combinable as they are concerned with the same field of endeavor, namely base induced polymerization processes for the production of poly(phenylene-vinylene). It would have been obvious to a person having ordinary skill in the art at the time of invention to have used the bis(halomethyl)arylene monomers of Hontis et al. in the process of Stern et al., and the motivation to do so would have been, as Hontis et al. suggests, they are functionally equivalent to the sulfonyl monomers of Stern et al. (pg. 5793).

The Office realizes that all of the claimed effects or physical properties are not positively stated by the reference(s). However, the reference(s) teaches all of the claimed ingredients and process steps. Therefore, the claimed effects and physical properties, i.e. the solubility of the resultant polymer in an organic solvent would implicitly be achieved by a process using the claimed ingredients and process steps. If

it is the applicant's position that this would not be the case: (1) evidence would need to be provided to support the applicant's position; and (2) it would be the Office's position that the application contains inadequate disclosure that there is no teaching as to how to obtain the claimed properties with only the claimed ingredients.

Considering Claim 2: Stern et al. teaches using a chlorine, bromine or iodine halogen (3:22-23).

Considering Claim 3: Stern et al. teaches carrying out the polymerization in a solvent that can be an ether, alcohol (7:66-67), or DMSO (16:8-10).

Considering Claim 4: Stern et al. teaches the reaction as occurring at a concentration of 0.005 to 5 mol/L (13:59-61).

Considering Claim 5: Stern et al. teaches the base as being an alkali metal hydroxide or an alkali metal alkoxide (7:18-26).

Considering Claim 6: Stern et al. teaches the base as being present in the range of 1 to 10 equivalents in comparison to the monomers (7:36-40).

Considering Claims 8 and 9: Stern et al. teaches using monomers of instant Formula XXIV or XXV (Formula I). R^1 and R^2 are explicitly defined as capable of being a benzyl group (3:26-30) and L is explicitly defined as capable of being a chlorine or bromine atom (3:23-24).

Claims 11-13 and 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stern et al. (US Pat. 5,763,539) as evidenced by Taylor et al., Substituted PPV's for Blue Light.

Considering Claim 11: Stern et al. teaches a process for preparing poly(arylenevinylenes) from a halomethylsulfonimethylarylene (Figure I) by base induced dehalogenation (scheme I), where the reaction is carried out in the presence of a compound of Formula I (Formula I). Stern et al. teaches using mixtures of different monomers (6:60-63). Stern et al. does not explicitly teach the end units of Formulas Ia and Ib. However, since Stern et al. teaches all the claimed process steps in the product by process claim, it will necessarily produce a product as shown in the claimed formulas.

Stern et al. does not teach the claimed mol%. However, differences in concentration will generally not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. See MPEP §2144.05. Taylor et al. shows that the amount of the hindered monomer will alter the molecular weight (Section 2.1), thus making it a result effective variable. It would have been obvious to a person having ordinary skill in the art at the time of the invention to have optimized the mol% of the monomers of formula I, and the motivation to do so would have been, as Taylor et al. suggests, to give the desired lower molecular weight (Section 2.1). Stern et al. teaches that reducing the molecular weight would be desired to prevent precipitation of the polymer (3:8-10).

The Office realizes that all of the claimed effects or physical properties are not positively stated by the reference(s). However, the reference(s) teaches all of the claimed ingredients and process steps. Therefore, the claimed effects and physical properties, i.e. the solubility of the resultant polymer in an organic solvent would implicitly be achieved by a process using the claimed ingredients and process steps. If it is the applicant's position that this would not be the case: (1) evidence would need to be provided to support the applicant's position; and (2) it would be the Office's position that the application contains inadequate disclosure that there is no teaching as to how to obtain the claimed properties with only the claimed ingredients.

Considering Claims 12 and 13: Stern et al. teaches the monomers as being incorporated into a polyarylenevinylene (2:67) that can be a homopolymer or copolymer (6:60-62).

Considering Claim 15: Stern et al. teaches a device comprising the poly(arylenevinylene), and two contact layers, one of which has a positive charge relative to the other (1:23-37).

Considering Claims 16 and 17: Stern et al. teaches using the polymer in a polymeric light emitting diode (1:12-15).

Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Stern et al. (US Pat. 5,763,539) as evidenced by Taylor et al., Substituted PPV's for Blue Light

as applied to claim 11 above, and further in view of Burroughes et al. (US 2003/0124341).

Considering Claim 18: Stern et al. teaches the composition of claim 11 as shown above.

Stern et al. does not teach using the polymer in one of the claimed devices. However, Burroughes et al. teaches using a poly(arylenevinylene) (¶0041) in an organic thin-film transistor or an organic solar cell (¶0010). Stern et al. and Burroughes et al. are combinable as they are concerned with the same field of endeavor, namely poly(arylenevinylenes). It would have been obvious to a person having ordinary skill in the art at the time of the invention to have made a device as in Burroughes et al. from the composition of Stern et al., and the motivation to do so would have been, as Burroughes et al. suggests, conjugated semiconductors provide superior devices (¶0038).

Response to Arguments

Applicant's arguments filed July 15, 2008 have been fully considered but they are not persuasive, because:

A) Applicants argument that Taylor discloses insoluble polymers is not persuasive. Stern et al. teaches that their polymers are soluble in an organic solvent (4:1-6 and 7:47-8:25). As the monomers of Stern include those of Formula I (Formula I), a person having ordinary skill in the art at the time of invention would not necessarily assume that the polymers comprising a monomer of Formula I would be insoluble. Additionally, while Taylor does describe their polymers as being "largely insoluble" (page 1121), it is not clear what medium the solubility has been measured in. As the solubility of a substance is dependent on the solvent, a person having ordinary skill in the art at the time of invention would not be able to eliminate the polymer of Taylor as being soluble in the broad range of organic solvent, based solely on the teaching of the reference.

Additionally, applicant has alleged that conjugated polymers have a considerably worse solubility than their non-conjugated counterparts, but has not provided any

support for this statement. The arguments of counsel cannot take the place of evidence in the record. *In re Schulze*, 346 F.2d 600, 602, 145 USPQ 716, 718 (CCPA 1965); *In re Geisler*, 116 F.3d 1465, 43 USPQ2d 1362 (Fed. Cir. 1997). See MPEP § 716.02(c). As Stern et al. shows that the conjugated polymers are soluble in an organic solvent (4:1-6 and 7:47-8:25), this statement cannot be considered to be applicable in the present instance. However, if the applicant provide evidence to show that the conjugated polymer would be insoluble it could be an indicator of unobviousness, as a person having ordinary skill in the art at the time of invention would not expect of copolymer of two insoluble homopolymers to be soluble.

B) Applicants argument that the amount of monomers based on Formula I is not a result effective variable is not persuasive. A particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation. *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977). See MPEP § 2144.05. As shown by Taylor, the amount of the hindered monomer will alter the molecular weight (Section 2.1), thus making it a result effective variable. Additionally, Stern et al. teaches that reducing the molecular weight would be desired to prevent precipitation of the polymer/increase solubility (3:8-10). Therefore, the amount of the hindered monomer would be a result effective variable that directly controls a property that Stern et al. desires.

Applicants can rebut a *prima facie* case of obviousness based on overlapping ranges by showing the criticality of the claimed range. See MPEP § 2144.05. There has been no evidence submitted that shows the criticality of the claimed range. If the applicant has evidence showing the criticality of the claimed range, they are invited to submit it in order to overcome the *prima facie* obviousness rejection.

C) Applicants argument that Stern et al. does not explicitly teach the formula (1a) or (1b) is not persuasive. Claims 11-13 and 15-18 are product by process claims. As modified Stern et al. teaches all the claimed process steps as shown above, it would necessarily teach the structure derived from these process steps. If it is the applicant's position that this would not be the case: (1) evidence would need to be provided to

support the applicant's position; and (2) it would be the Office's position that the application contains inadequate disclosure that there is no teaching as to how to obtain the claimed structure with only the claimed process steps.

Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Liam J. Heincer whose telephone number is 571-270-3297. The examiner can normally be reached on Monday thru Friday 7:30 to 5:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Eashoo can be reached on 571-272-1197. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mark Eashoo, Ph.D./

Supervisory Patent Examiner, Art Unit 1796
26-Sep-08

LJH

September 9, 2008